

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Canceled).

2. (Currently Amended) A method of blind identification of sources within a system including P sources and N receivers, comprising the steps of:

identifying the matrix of direction vectors of the sources from the information proper to the direction vectors \mathbf{a}_p of the sources contained redundantly in the $m=2q$ order circular statistics of the vector of the observations received by the N receivers,

[[The method according to claim 1,]] wherein the $m = 2q$ order circular statistics are expressed according to a full-rank diagonal matrix of the autocumulants of the sources and a matrix representing the juxtaposition of the direction vectors of the sources as follows:

$$\mathbf{C}_{m,x} = \mathbf{A}_q \boldsymbol{\zeta}_{m,s} \mathbf{A}_q^H$$

where $\boldsymbol{\zeta}_{m,s} = \text{diag}([C_{1,1,\dots,1,s}^{1,1,\dots,1}, \dots, C_{P,P,\dots,P,s}^{P,P,\dots,P}])$ is the full-rank diagonal matrix of the $m = 2q$ order autocumulants $C_{P,P,\dots,P,s}^{P,P,\dots,P}$ des sources, sized $(P \times P)$, and where $\mathbf{A}_q = [a_1^{\otimes(q-1)} \otimes a_1^* \dots a_p^{\otimes(q-1)} \otimes a_p^*]$, sized $(N^q \times P)$ and assumed to be of full rank, represents the juxtaposition of the P column vectors $[a_p^{\otimes(q-1)} \otimes a_p^*]$.

3. (Currently Amended) The method according to claim [[1]] 2, further comprising the following steps:

a) $[[:]]$ the building, from the different observation vectors $x(t)$, of an estimate $\hat{C}_{m,x}$ of the matrix of statistics $C_{m,x}$ of the observations,

b) $[[:]]$ decomposing a singular value of the matrix $\hat{C}_{m,x}$, and deducing therefrom of an estimate \hat{P} of the number of sources P and a square root $\hat{C}_{m,x}^{1/2}$ of $\hat{C}_{m,x}$, in taking $\hat{C}_{m,x}^{1/2} = E_s |L_s|^{1/2}$ where $|.$ designates the absolute value operator, where L_s and E_s are respectively the diagonal matrix of the \hat{P} greatest real eigenvalues (in terms of absolute value) of $\hat{C}_{m,x}$ and the matrix of the associated orthonormal eigenvectors;

c) $[[:]]$ extracting, from the matrix $\hat{C}_{m,x}^{1/2} = [\Gamma_1^T, \dots, \Gamma_N^T]^T$, of the N matrix blocks Γ_n : each block Γ_n sized $(N^{(q-1)} \times P)$ being constituted by the $N^{(q-1)}$ successive rows of $\hat{C}_{m,x}^{1/2}$ starting from the " $N^{(q-1)}(n-1)+1$ "th row;

d) $[[:]]$ building of the $N(N-1)$ matrices $\Theta_{n1,n2}$ defined, for all $1 \leq n_1 \neq n_2 \leq N$, by $\Theta_{n1,n2} = \Gamma_{n1} \# \Gamma_{n2}$ where $\#$ designates the pseudo-inversion operator;

e) $[[:]]$ determining of the matrix V_{sol} , resolving the problem of the joint diagonalization of the $N(N-1)$ matrices $\Theta_{n1,n2}$;

f) $[[:]]$ for each of the P columns b_p of A , the extraction of the $K = N^{(q-2)}$ vectors $b_p(k)$ stacked beneath one another in the vector $b_p = [b_p(1)^T, b_p(2)^T, \dots, b_p(K)^T]^T$;

g) $[[:]]$ converting said column vectors $b_p(k)$ sized $(N^2 \times 1)$ into a matrix $B_p(k)$ sized $(N \times N)$;

h) $[[:]]$ joint singular value decomposition or joint diagonalization of the $K = N^{(q-2)}$ matrices $B_p(k)$ in retaining therefrom, as an estimate of the column vectors of A , of the eigenvector common to the $-K$ matrices $B_p(k)$ associated with the highest eigenvalue (in terms of modulus);

i) [[:]] repetition of the steps f) to h) for each of the P columns of \hat{A}_q for the estimation, without any particular order and plus or minus a phase, of the P direction vectors \mathbf{a}_p and therefore the estimation, plus or minus a unitary trivial matrix, of the mixture matrix \mathbf{A} .

4. (Currently Amended) The method according to claim [[1]] 2, wherein the number of sensors N is greater than or equal to the number of sources P and comprising a step of extraction of the sources, consisting of the application to the observations $\mathbf{x}(t)$ of a filter built by means of the estimate \hat{A}_q of \mathbf{A} .

5. (Previously Amended) The method according to claim 2, wherein $\mathbf{C}_{m,x}$ is equal to the matrix of quadricovariance \mathbf{Q}_x and wherein $m = 4$.

6. (Previously Amended) The method according to claim 2, wherein $\mathbf{C}_{m,x}$ is equal to the matrix of hexacovariance \mathbf{H}_x and wherein $m = 6$.

7. (Currently Amended) The method according to claim [[1]] 2, comprising a step for the evaluation of the quality of the identification of the associated direction vector in using a criterion such that:

$$D(\mathbf{A}, \hat{\mathbf{A}}) = (\alpha_1, \alpha_2, \dots, \alpha_P)$$

where

$$\alpha_p = \min_{1 \leq i \leq P} [d(\mathbf{a}_p, \hat{\mathbf{a}}_i)] \quad [[[17]]]$$

and where $d(\mathbf{u}, \mathbf{v})$ is the pseudo-distance between the vectors \mathbf{u} and \mathbf{v} , such that :

$$d(\mathbf{u}, \mathbf{v}) = 1 - \frac{|\mathbf{u}^H \mathbf{v}|^2}{(\mathbf{u}^H \mathbf{u})(\mathbf{v}^H \mathbf{v})} \quad [[(18)]]$$

8. (Currently Amended) The use of the method according to claim [[1]] 2, for use in a communications network.

9. (Currently Amended) A use of the method according to claim [[1]] 2, for goniometry using identified direction vectors.

10. (Previously Presented) The method according to claim 2, wherein the number of sensors N is greater than or equal to the number of sources P and wherein the method comprises a step of extraction of the sources, consisting of the application to the observations $x(t)$ of a filter built by means of the estimate \hat{A} of A .

11. (Previously Presented) The method according to claim 3, wherein the number of sensors N is greater than or equal to the number of sources P and wherein the method comprises a step of extraction of the sources, consisting of the application to the observations $x(t)$ of a filter built by means of the estimate \hat{A} of A .

12. (Previously Presented) The method according to claim 3, wherein $C_{m,x}$ is equal to the matrix of quadricovariance Q_x and wherein $m = 4$.

13. (Previously Presented) The method according to claim 4, wherein $C_{m,x}$ is equal to the matrix of quadricovariance Q_x and wherein $m = 4$.

14. (Previously Presented) The method according to claim 3, wherein $C_{m,x}$ is equal to the matrix of hexacovariance H_x and wherein $m = 6$.

15. (Previously Presented) The method according to claim 4, wherein $C_{m,x}$ is equal to the matrix of hexacovariance H_x and wherein $m = 6$.

16. (Previously Presented) The method according to claim 2, comprising a step for the evaluation of the quality of the identification of the associated direction vector in using a criterion such that:

$$D(A, \hat{A}) = (\alpha_1, \alpha_2, \dots, \alpha_P)$$

where

$$\alpha_p = \min_{1 \leq i \leq P} [d(\mathbf{a}_p, \hat{\mathbf{a}}_i)]$$

and where $d(\mathbf{u}, \mathbf{v})$ is the pseudo-distance between the vectors \mathbf{u} and \mathbf{v} , such that :

$$d(\mathbf{u}, \mathbf{v}) = 1 - \frac{|\mathbf{u}^H \mathbf{v}|^2}{(\mathbf{u}^H \mathbf{u})(\mathbf{v}^H \mathbf{v})}$$

17. (Previously Presented) The method according to claim 3, comprising a step for the evaluation of the quality of the identification of the associated direction vector in using a criterion such that:

$$D(A, \hat{A}) = (\alpha_1, \alpha_2, \dots, \alpha_P)$$

where

$$\alpha_p = \min_{1 \leq i \leq P} [d(\mathbf{a}_p, \hat{\mathbf{a}}_i)]$$

and where $d(\mathbf{u}, \mathbf{v})$ is the pseudo-distance between the vectors \mathbf{u} and \mathbf{v} , such that :

$$d(\mathbf{u}, \mathbf{v}) = 1 - \frac{|\mathbf{u}^H \mathbf{v}|^2}{(\mathbf{u}^H \mathbf{u})(\mathbf{v}^H \mathbf{v})}$$

18. (Previously Presented) The method according to claim 4, comprising a step for the evaluation of the quality of the identification of the associated direction vector in using a criterion such that:

$$D(A, \hat{A}) = (\alpha_1, \alpha_2, \dots, \alpha_P)$$

where

$$\alpha_p = \min_{1 \leq i \leq P} [d(\mathbf{a}_p, \hat{\mathbf{a}}_i)]$$

and where $d(\mathbf{u}, \mathbf{v})$ is the pseudo-distance between the vectors \mathbf{u} and \mathbf{v} , such that :

$$d(\mathbf{u}, \mathbf{v}) = 1 - \frac{|\mathbf{u}^H \mathbf{v}|^2}{(\mathbf{u}^H \mathbf{u})(\mathbf{v}^H \mathbf{v})}$$

19. (Previously Presented) The method according to claim 5, comprising a step for the evaluation of the quality of the identification of the associated direction vector in using a criterion such that:

$$D(A, \hat{A}) = (\alpha_1, \alpha_2, \dots, \alpha_P)$$

where

$$\alpha_p = \min_{1 \leq i \leq P} [d(\mathbf{a}_p, \hat{\mathbf{a}}_i)]$$

and where $d(\mathbf{u}, \mathbf{v})$ is the pseudo-distance between the vectors \mathbf{u} and \mathbf{v} , such that :

$$d(\mathbf{u}, \mathbf{v}) = 1 - \frac{|\mathbf{u}^H \mathbf{v}|^2}{(\mathbf{u}^H \mathbf{u})(\mathbf{v}^H \mathbf{v})}$$

20. (Previously Presented) The method according to claim 6, comprising a step for the evaluation of the quality of the identification of the associated direction vector in using a criterion such that:

$$D(A, \hat{A}) = (\alpha_1, \alpha_2, \dots, \alpha_P)$$

where

$$\alpha_p = \min_{1 \leq i \leq P} [d(\mathbf{a}_p, \hat{\mathbf{a}}_i)]$$

and where $d(\mathbf{u}, \mathbf{v})$ is the pseudo-distance between the vectors \mathbf{u} and \mathbf{v} , such that :

$$d(\mathbf{u}, \mathbf{v}) = 1 - \frac{|\mathbf{u}^H \mathbf{v}|^2}{(\mathbf{u}^H \mathbf{u})(\mathbf{v}^H \mathbf{v})}$$